



## **USING MATHEMATICS**

# *Guide to Preparation*

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# **1 Overview to preparation**

Welcome to the preparatory materials for the course MST121 *Using Mathematics*. You need to work on these materials BEFORE the start of the course in February. This book is the core guide on how to use the other preparatory materials. Like all the learning materials, it is yours to use as you wish but you may find it helpful to tick off each section, on the contents page, as you complete it.

## ***Dealing with Open University parcels***

If this is your first course with the Open University (OU), then you may have been somewhat overwhelmed by the contents of your first parcel. Whenever course materials arrive, you could usefully adopt the following procedure.

1. Open the parcel on arrival.
2. Check items against the Contents Checklist. (If anything is missing, follow the instructions on the Checklist.)
3. Read the Stop Press.
4. Correct any errata as notified in the Stop Press.
5. Organise the materials (perhaps have a quick flick through) and then store them together (more of this in Section 3).
6. Get ready to start work. (This includes planning your time, a topic also covered in Section 3.)

If you have not already carried out steps 2–4 for this parcel, then do it NOW and then come back to working through this Guide.

## ***Using learning materials***

The OU provides the course materials (texts, computer programs, audio tapes, video tapes, TV programmes), assessment, face-to-face tutorials and a personal tutor contactable by phone; but you are in charge of the learning.

Guidance is given on how to use the materials, and how to organise your time, but it is up to you to decide on what is best for you and your circumstances. The learning materials provided are for you to make your own – they are not textbooks to be handed back, so feel free to make notes on them, underlining and highlighting excerpts as you go along.

## Things to do

There are a number of things you need to do so that you are ready for the start of the course – rather like a sports player getting ready for the new season. Some things need to be done before others, and some can be done at the same time as others.

You need to:

- ◊ check (and perhaps buy) equipment;
- ◊ organise study space and plan preparation time;
- ◊ start to get used to learning at a distance;
- ◊ make sure your mathematics knowledge and skills are up to date and in practice by using the *Revision Pack* (which includes a Diagnostic Quiz);
- ◊ do and send off the practice assignments (in the *Preparatory Assignment Booklet*).

The following diagram indicates roughly the appropriate time-scale for these activities.

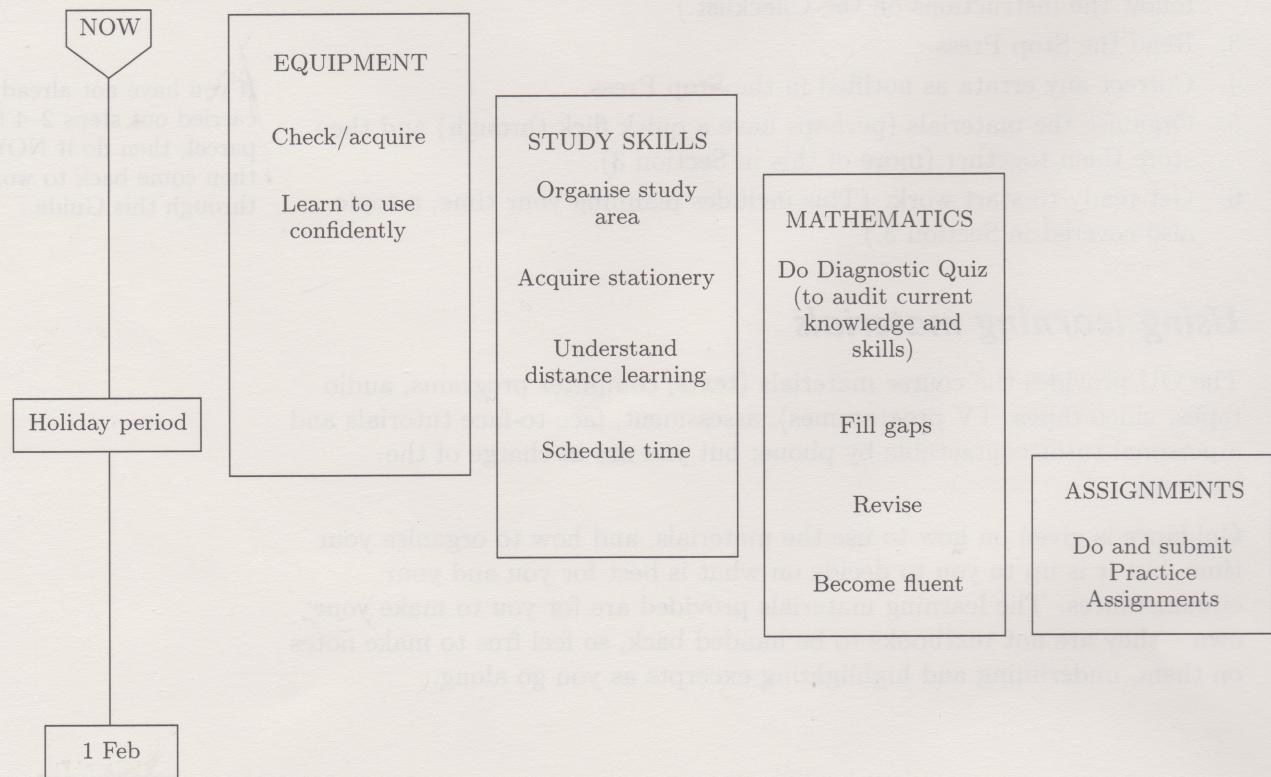


Figure 1.1 Time-scale

This *Guide to Preparation* is designed to help you to achieve all of this by working through it in order. How much time each section takes will depend on your particular circumstances – if you are new to OU study and your maths is rusty, then it could all take some time. In particular, as a result of doing the Diagnostic Quiz (in the *Revision Pack*), you will be advised to study relevant items in the *Revision Pack*. This study may necessitate revision of the time scheduling that you will carry out in Section 3. These features are illustrated in the Study Guide diagram in Figure 1.2.

If you are very pressed for time or are already an experienced OU student, then use Figure 1.1 and the Study Guide diagram to make the best use of the time you have before the start of the course.

## Study guide

Every chapter of the course has a Study Guide diagram to guide you through the various components. The Study Guide diagram for this *Guide to Preparation* is shown in Figure 1.2. The numbers in the left-hand column correspond to the section numbers in this *Guide to Preparation*.

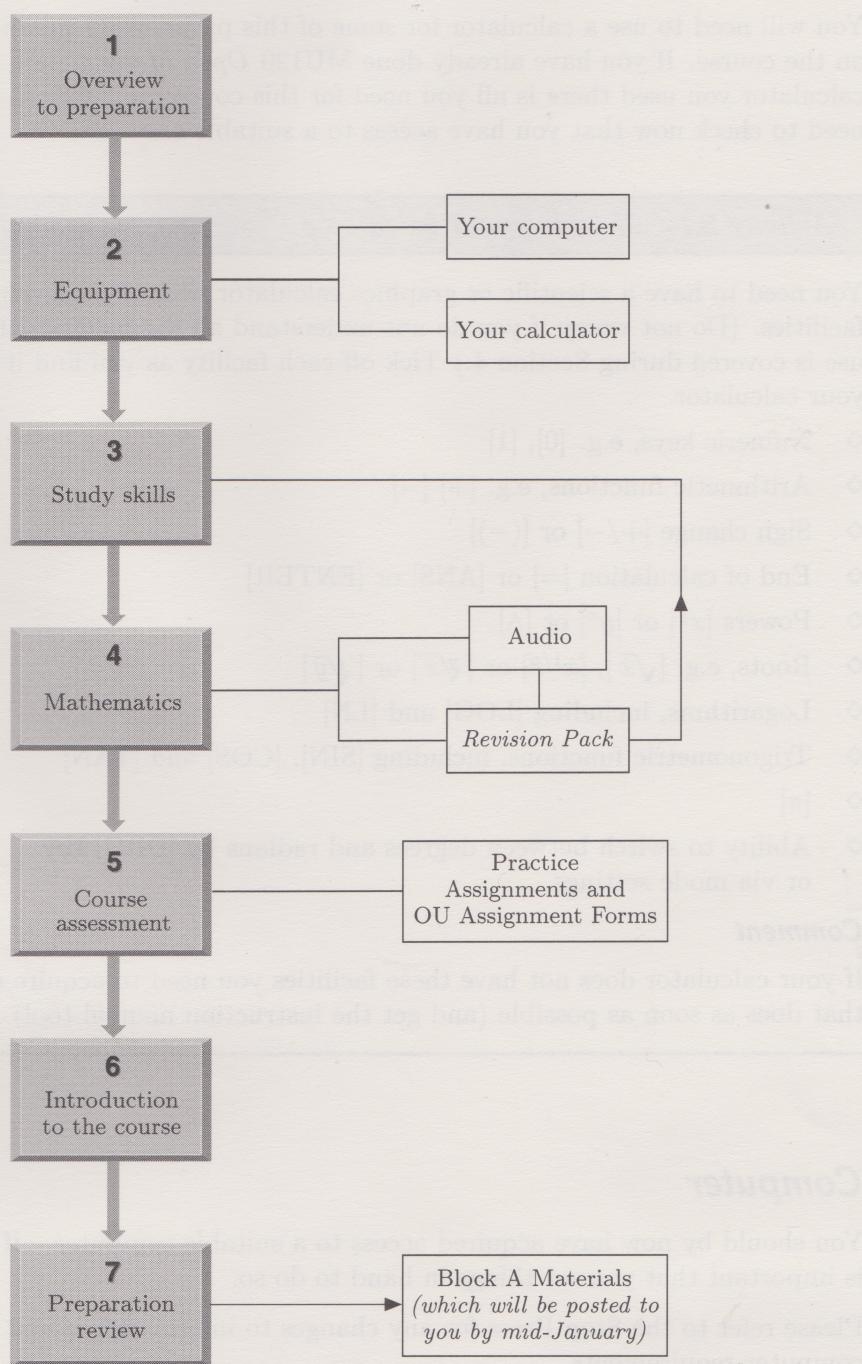


Figure 1.2 Study Guide diagram

## 2 Equipment

### Calculator

You will need to use a calculator for some of this preparatory material and on the course. If you have already done MU120 *Open Mathematics*, the calculator you used there is all you need for this course; but if not, you need to check now that you have access to a suitable one.

#### Activity 2.1 Checking your calculator

You need to have a scientific or graphics calculator with the following facilities. (Do not worry if you do not understand all the facilities: their use is covered during Section 4.) Tick off each facility as you find it on your calculator.

- ◊ Numeric keys, e.g. [0], [1]
- ◊ Arithmetic functions, e.g. [+] [-]
- ◊ Sign change [+/-] or [(-)]
- ◊ End of calculation [=] or [ANS] or [ENTER]
- ◊ Powers [ $x^y$ ] or [ $y^x$ ] or [ $\wedge$ ]
- ◊ Roots, e.g. [ $\sqrt{x}$ ], [ $x^{1/y}$ ] or [ $\sqrt[4]{x}$ ] or [ $\sqrt[3]{y}$ ]
- ◊ Logarithms, including [LOG] and [LN]
- ◊ Trigonometric functions, including [SIN], [COS] and [TAN]
- ◊ [ $\pi$ ]
- ◊ Ability to switch between degrees and radians by [DRG] key or via mode settings

#### Comment

If your calculator does not have these facilities you need to acquire one that does as soon as possible (and get the instruction manual too!)

### Computer

You should by now have acquired access to a suitable computer – if not, it is important that you set things in hand to do so.

Please refer to the Stop Press for any changes to information about computer requirements.

## Activity 2.2 Basic computer skills

You do not need to know very much about computers to do this course, but you do need to be confident in the basics. Go through the following list, ticking what you can do and what you are confident in doing.

	can do	confident in
◊ Switching on to get the <i>Windows</i> startup screen	<input type="checkbox"/>	<input type="checkbox"/>
◊ Using the mouse (moving the pointer, clicking and double-clicking the button)	<input type="checkbox"/>	<input type="checkbox"/>
◊ Running/starting a program	<input type="checkbox"/>	<input type="checkbox"/>
◊ Opening, closing and saving files	<input type="checkbox"/>	<input type="checkbox"/>
◊ Minimising, maximising and closing program windows	<input type="checkbox"/>	<input type="checkbox"/>
◊ Printing	<input type="checkbox"/>	<input type="checkbox"/>
◊ Using <i>Windows</i> Help	<input type="checkbox"/>	<input type="checkbox"/>
◊ Shutting down the computer	<input type="checkbox"/>	<input type="checkbox"/>

### Comment

If you have not ticked being confident in all these things, then you will need to allocate some of your preparation time to becoming so – and perhaps find a friend who can help.

If you need to learn on your own, then remember that your computer has some built in help. You can get to this as follows.

- ◊ Switch on.
- ◊ Wait until the *Windows* startup screen appears.
- ◊ Use the mouse to move the pointer over **Start** (usually in the bottom left-hand corner of the screen).
- ◊ Click the mouse using the left-hand button to open the **Start** menu.
- ◊ Move the pointer to **Help** as shown in Figure 2.1.

You will be planning your preparation in Section 3.

This help is not available on computers running the *Windows 3.1* operating system.

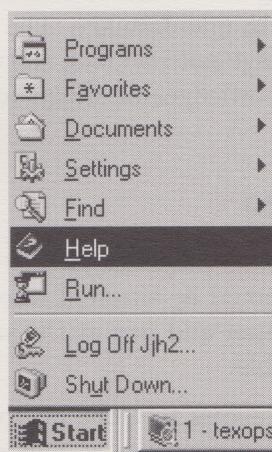


Figure 2.1 Start menu with **Help** highlighted

- ◊ Select **Help** by again clicking with the left-hand mouse button.

Figure 2.1 and Figure 2.2 are both pictures from *Windows 98*. If you have a different version of *Windows* (e.g. *Windows 95*), your screen will look slightly different.

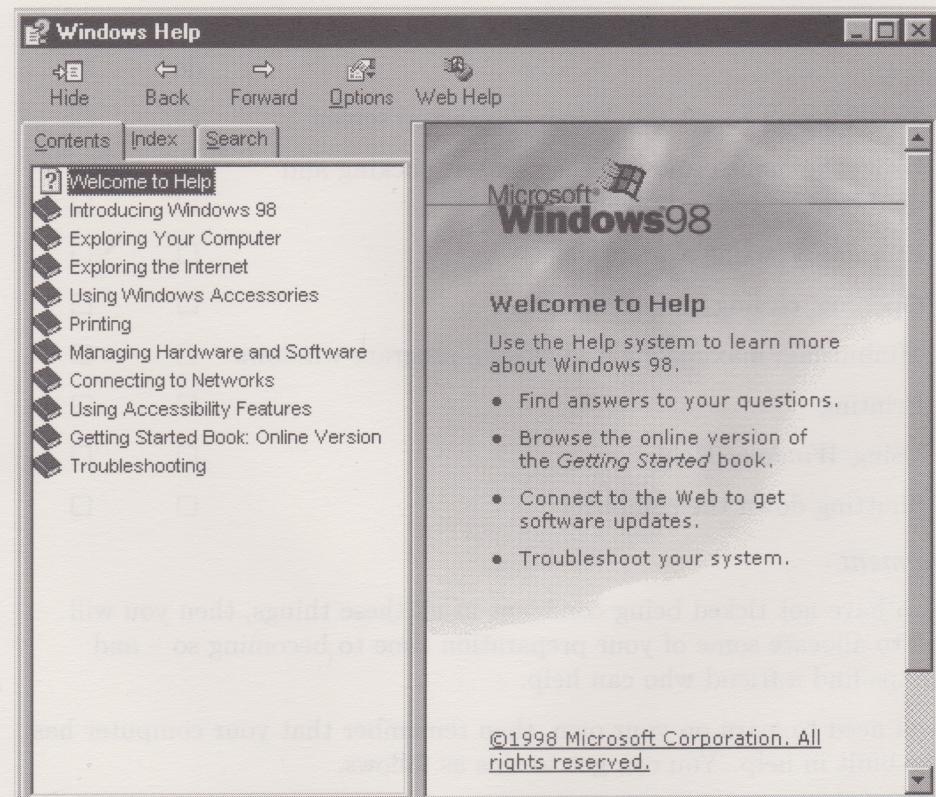


Figure 2.2 Windows Help

- ◊ Depending on which version of *Windows* you are using and how your desktop is set up, you will then see something like Figure 2.2.
- ◊ The online version of the *Getting Started* book (see the second bullet point in Figure 2.2) gives a basic guide to using *Windows 98*. The equivalent guide in *Windows 95* is called *Tour*.

Full instructions for installing the course software will be provided with the course materials sent to you in mid-January. The installation procedure is straightforward, but if you have not installed software yourself before, you may wish to arrange for a knowledgeable friend to help you at the time.

## *Audio, TV and Video*

You will need access to an audio playback facility both for preparation and on the course. Ideally this should be situated where you plan to study. Since you will need to use paper and pen at the same time, a car audio player is unlikely to be suitable.

For the course you will need access to video playback facilities and a TV. *It is useful to record the TV programmes so that you can watch them more than once – and at times to suit you.* Check the Stop Presses for the dates of TV broadcasts.

### **3 Study skills**

#### ***Studying at a distance***

Any study takes time, effort and organisation; distance learning is no different, but demands a great deal of self-discipline. To get ready for a period of concentrated study you need to have everything ready before the course starts, have a clear picture of what you are going to do and when.

#### ***Space and storage***

You need to think about where you are going to work – ideally a place where you will be able to work undisturbed and where you have sufficient space to store all the course chapters as they arrive.

#### ***Stationery***

It is essential you have the following items.

- ◊ A4 paper (plain or lined, punched is ideal)
- ◊ graph paper (a few sheets)
- ◊ paper for printer
- ◊ pen
- ◊ HB pencil
- ◊ eraser

In order to organise your work, the following will be useful.

- ◊ ring binder(s)
- ◊ ring binder dividers
- ◊ magazine boxes, or home-made equivalent, for storing course units
- ◊ hole-punch or punched plastic pockets

#### ***Organising time***

Being self-disciplined about the use of time is the key to developing good study habits, and to not getting overwhelmed by the different tasks and assignment deadlines.

You are strongly advised to set up your own planning sheets for preparation, both medium and short term. You already have some items to go on them and as you work through this Guide there will be others to add (see the examples below).

You will need to identify times when you can study and times when you cannot because of other commitments. (You may even have to reduce your regular commitments to make time for study.)

If you have not studied for a while, you may find it more profitable to plan several short study sessions rather than fewer long ones until you get into the study habit. By the time the course starts in February you need to be used to working in periods of at least 1–2 hours at a time.

At this stage your planning sheets might look something like these.

### Sheet 0 Checklist (example)

To Do/Remember
Check calculator.
Set up computer.
Practice using computer's Help.
Make list of questions for regional new students meeting.
Organise work area and stationery.
Send off Practice Assignments by 15 Jan or earlier.

### Sheet 1 Preparation overview (example, with notional dates)

Week begins	Mon	Tues	Wed	Thur	Fri	Sat	Sun
Nov 24				Organise study area		Buy a new calculator	
Dec 1		Work through this prep guide					
Dec 8				Do Diagnostic Quiz			
Dec 15				Start work on maths revision			
Dec 22				Holiday period			
Dec 29		Work on maths			Set up and use computer		
Jan 5		Work on maths				Do assignments	
Jan 12		Work on maths					
Jan 19		Work on maths					
Jan 26		Organise and plan Block A				Start course	

### Sheet 2 Weekly planning (blank example, with notional dates)

Dec 1	morning	afternoon	evening
Mon 1			
Tues 2			
Wed 3			
Thur 4			
Fri 5			
Sat 6			
Sun 7			

It is a good idea to include family and other commitments.

### Activity 3.1 Planning

Set up your own planning sheets now. Leave plenty of space because you will need to add to and revise them as you complete this Guide.

### Setting up work file(s)

There will be several types of work which you will need to keep, store and be able to refer to:

- ◊ work plans and timetables;
- ◊ mathematical work from units;
- ◊ learning notes;
- ◊ work towards assignments.

Whether you keep the above items in one file or in separate ones is up to you. Your work should be organised in a way that is going to be useful to you during the course, when revising for the examination and after the course.

Any notes need some kind of reference to *what* you were doing (e.g. a ‘title’) and perhaps *when* (the date), if they are to make any sense when you look back at them in a few weeks.

### Learning notes

Learning a topic takes place over time. It is not enough just to read through materials and do the activities suggested; to really understand, remember and be able to apply a topic, you need to be much more active.

Learning a topic usually involves previewing it, carrying out prescribed reading and activities, and reviewing it. These stages are interrelated and contribute to successful learning.

As you are studying you need to think about what you are learning, where you are having problems and what makes things easier. The best way of doing this is to make notes as you go along and keep them in a learning file. Not just notes about the course content, but also about how and where you learn best, good strategies for coping with challenging work and what to do if you get stuck.

Throughout the course you will be asked to reflect on your learning. This is an active and important part of effective study. It is also good for your morale to realise how much you have learnt.

### Activity 3.2 So far

What have you achieved so far?

Have you been working actively with this text? Have you completed the checklists, made some study plans, found a good place and times to work?

Are you ready to start thinking about mathematics? If not, what are you going to do *now* before moving on to the next section, how long will it take you, how can you best use the available time?

## 4 Mathematics

You may not have studied mathematics for a while; you may not even have studied any since leaving school. You may think that mathematics is just about doing calculations and drawing graphs, but the development of mathematics is linked closely to human development over the ages. Although mathematics is studied for its own sake, it is also studied for its usefulness in other areas of human activity.

### *Listening*

#### **Activity 4.1 Maths talk**

This activity is designed to get you into a mathematical mood and to give you experience of studying using audio tape.



*Listen to Band 1, ‘Measures and powers’, on the Preparatory audio tape.*

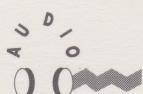
#### **Comment**

Were you active when you were listening, perhaps making notes? Could you now tell someone else what it was about? Have you learned anything new or become interested in something you had not thought about before? On a practical level, did you note the tape counter reading at the beginning and end?

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A major part of the study of any chapter in MST121 will involve reading and responding to the text. It is worth thinking about and doing some preparatory work on reading for learning at this early stage, so this section continues with Band 2 of the Preparatory audio tape, which refers to the frames below.

From time to time you will be asked to stop the tape and read what is in a frame, and possibly write on the frame in response to what is said or printed. You may prefer to do this in pencil so that you can erase and make amendments if you are not satisfied with your first attempts. Make sure that you are listening to the tape in circumstances which allow you to undertake the reading and writing comfortably.



#### **Activity 4.2 Reading words and symbols**

*Listen to Band 2, ‘Reading mathematics’, on the Preparatory audio tape.*

---

**Frame 1**

product

function

Everyday meaning of product ...

Everyday meaning of function ...

**Frame 2**

A **product** is a mathematical quantity obtained when two other quantities are multiplied together.

Example

15 is the product of 3 and 5.

A **function** is a process which does something to one set of mathematical objects to obtain a new set of mathematical objects.

So, for example, the function  $f$  given by

$$f(x) = \sin x$$

acts on a set of numbers which represent angles, or measures of turning, and outputs a new set of numbers between -1 and 1.

**Frame 3**

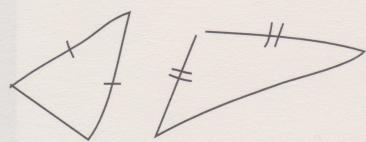
isosceles

cosine

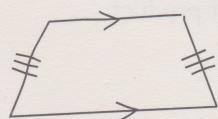
algorithm

**Frame 4**

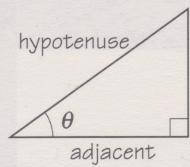
isosceles triangles



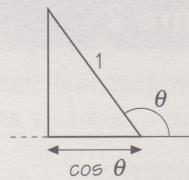
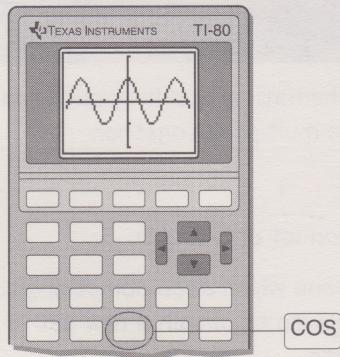
isosceles trapezium

**Frame 5**

cosine



$$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

**Frame 6**

Long division

$$\begin{array}{r} 319 \\ 23 \overline{)7337} \\ 69 \\ \hline 43 \\ 23 \\ \hline 207 \end{array}$$

Long multiplication

$$\begin{array}{r} 319 \\ \times 23 \\ \hline 6380 \\ 957 \\ \hline 7337 \end{array}$$

**Frame 7**

(a) My telephone number is 23136.  
The number of miles shown on the milometer is 23136.

(b) 7142  
0.7142  
71.42

(c) The area of a square of side 3 is  $3^2$ .  
The volume of a cube of side 2 is  $2^3$ .

**Frame 8**

- (a)  $3 + 4$
- (b)  $7 - 5$
- (c)  $7 - (-5)$
- (d)  $7 - (-^5)$

**Frame 9**

$$\begin{aligned}3y - 5 &= 7 \\y &= 2x + 1 \\\cos \theta &= -1\end{aligned}$$

$x$  and  $y$  are from the Roman alphabet,  
which is the alphabet used to write English  
 $\theta$  is from the Greek alphabet

**Frame 10**

Letters with special uses

$\pi$

$e$

$\mu$

**Frame 11**

Prefix	Symbol	Multiple
tera	T	$10^{12}$
giga	G	$10^9$
mega	M	$10^6$
kilo	k	$10^3$
centi	c	$10^{-2}$
milli	m	$10^{-3}$
micro	$\mu$	$10^{-6}$
nano	n	$10^{-9}$
pico	p	$10^{-12}$
femto	f	$10^{-15}$

**Frame 12***The Greek alphabet*

Capital	Lower case	Pronunciation
A	$\alpha$	alpha
B	$\beta$	beta
Γ	$\gamma$	gamma
Δ	$\delta$	delta
E	$\varepsilon$	epsilon
Z	$\zeta$	zeta
H	$\eta$	eta
Θ	$\theta$	theta
I	$\iota$	iota
K	$\kappa$	kappa
Λ	$\lambda$	lambda
M	$\mu$	mu
N	$\nu$	nu
Ξ	$\xi$	xi (pronounced 'ksi')
O	$\circ$	omicron
Π	$\pi$	pi
R	$\rho$	rho
Σ	$\sigma$	sigma
T	$\tau$	tau
Υ	$\upsilon$	upsilon
Φ	$\phi$	phi
X	$\chi$	chi (pronounced 'ki')
Ψ	$\psi$	psi
Ω	$\omega$	omega

## Getting up to speed

Now is the time to start reading and doing some mathematics of your own.

Before the course starts you need to get your mathematics up to speed. But what does this mean? It means being confident in using the various aspects of knowledge, skills and techniques that are assumed by the course. Your knowledge and understanding needs to be *fluent*. The *Revision Pack* has been designed to help you achieve this efficiently.

### Activity 4.3 Getting an overview

Quickly look through the *Revision Pack* – do not be tempted to use it just yet. What do you notice about its presentation and contents?

#### Comment

The *Revision Pack* is hole-punched and can be pulled apart to go into a ring binder. There are three sections:

- ◊ a Diagnostic Quiz (with answers) to audit where you are now;
- ◊ a series of modules containing revision notes, examples, exercises and exercise solutions;
- ◊ an index.

The purpose of the pack is to provide the means for you to:

- ◊ fill any gaps in your knowledge;
- ◊ revise your previous knowledge;
- ◊ gain fluency;
- ◊ build your confidence.

The index is given to help you find topics, but it can also be used as a checklist of mathematical words which you should understand. If you come across words and symbols which are unfamiliar, then perhaps start your own mathematical dictionary.

### Activity 4.4 Quiz

Work through the Diagnostic Quiz without looking at the answers. (If you pull the quiz out of the pack, you can intersperse some file paper to keep your workings with the questions.)

Check your answers and, as you do so, note how you did on each topic and perhaps decide a category (a)–(d), as below, for each topic:

- (a) a gap, need to learn this;
- (b) rusty, need to revise carefully;
- (c) a bit rusty, need a bit of practice;
- (d) no problems, up to speed.

You could do this in a margin on your working pages. For each topic, the quiz gives a reference to the relevant revision module.

Now make a prioritised list of topics reflecting the order in which you plan to study them.

You do not need to be able to remember formulas by heart. You will be provided with a mathematical handbook to use throughout the course – including in the examination.

**Comment**

If every topic is category (d), you are mathematically ready for the course. If most of your topics are categories (a) and (b), you may need to talk to your tutor about whether you should be doing MST121 this year. With mostly category (b) and (c) topics, you are going to need to spend considerable time studying the *Revision Pack* between now and the start of the course.

If you intend to study MS221 *Exploring Mathematics* as well as MST121 this year, you will need to feel very confident and have a high level of fluency in most topics.

**Activity 4.5 Revision planning**

Go to your planning timetables and put in when you are going work on particular sections of the *Revision Pack*.

Try to allocate specific lengths of time – you may need to amend these as you go along, but an initial time allocation will give you a structure to ensure that you do something on each specified topic.

---

Now choose one topic to work on from the *Revision Pack*, preferably one needing the use of a calculator, and work on this as directed in Activity 4.6.

**Activity 4.6 Reading actively**

Study your chosen topic as follows.

Skim read it first to obtain an overview of the work you propose to tackle.

Now work through the topic in more detail, paying particular attention to those parts which you have identified as important for you. Read through the notes and examples, and work on as many of the exercises as you feel is necessary. Keep a pen ready to make notes of the important points, and have a calculator nearby for use when appropriate.

When you have finished, note how long you have spent on this activity.

**Comment**

In general, making copious notes or rewriting the text is not worthwhile, but you may have found it useful to make a summary of keywords and ideas, including page references. Detailed working of exercises can impress ideas on the mind and you may feel that your worked exercises are sufficient as notes, particularly if you have annotated the text as well.

Was the time you spent more or less as you expected? If it was much shorter or longer, can you see any reason why this is so?

---

A short time spent on reviewing what you have done promotes effective learning, and this is the focus of Activity 4.7.

### Activity 4.7 Reviewing your study

Look back over your work done in response to Activity 4.6. Have you learned anything new or regained confidence in old learning? Look through the questions below, which should help you to become aware of aspects of your learning. Record significant points.

- ◊ Consider how you managed your study. How did you begin? Did you take a break? Did you get stuck? How did you then move forward, or did you stop? Did you actually make notes – and where did you put them? Were you able to assess whether you were learning? How did you feel when you had finished?
- ◊ Do you think that you have mastered most of the material that you have studied? Could you apply the ideas in a new situation? Could you explain what you have learnt to another person, or work through a related problem at a tutorial?

If not, you should return, perhaps after a break, to anything you feel you have not mastered. Note any pages which you think require extra work.

- ◊ Could you have organised your study better, by preparing for it better or acting differently while you studied?

If so, it might be helpful to make a note of what could be improved.

Now is the time to proceed with revising the topics on your prioritised list, by using the *Revision Pack*. Carry out Activity 4.8 when you are some way down your list of topics.

### Activity 4.8 Taking stock of study skills

You may have discovered some general factors which have an impact on the effectiveness of your study. Think back over the periods you have spent working on this Guide and the *Revision Pack*, and make notes based on the following questions.

- ◊ Have you enjoyed your studies? If so, why? If not, why not?
- ◊ Can you remember what you have done?
- ◊ Can you follow your notes and workings? If not, what would make them clearer?
- ◊ Did you find long or short study sessions more productive?
- ◊ Did the time of day or the place make a difference?
- ◊ Were there times when you found concentrating difficult? Can you think why?
- ◊ Did you find it difficult working on your own?
- ◊ What did you do if you found something difficult?
- ◊ Did your need to study conflict with work, social commitments or family? If so, have you resolved the problem? If not, what are you going to do about it, and when?

**Comment**

You need to look after your key resources: motivation, energy and concentration.

- ◊ Look after yourself.
- ◊ Involve friends and family.
- ◊ Vary the type of work.
- ◊ Set yourself a realistic objective for each study period.
- ◊ Know what to do when you are stuck:
  - ◊ explain to a friend;
  - ◊ talk to your tutor;
  - ◊ take a break;
  - ◊ skip over the problem (later studies may help).
- ◊ Beware of:
  - ◊ filling in time, not studying productively;
  - ◊ letting schedules slip;
  - ◊ telling yourself you understand when you don't.
- ◊ Review progress regularly.
- ◊ Continue to plan and organise your studying.
- ◊ Celebrate your achievements.

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At this stage in your preparation you may be in the difficult situation of having several things that need doing:

- ◊ gaining confidence with the computer;
- ◊ revising mathematics;
- ◊ getting used to a new calculator;
- ◊ finishing this Guide;
- ◊ non-course related tasks at work or home.

***Activity 4.9 Revising your schedule***

Look again at the study plan you made in Activity 4.5. Is it feasible? Is it adequate? Should your schedule include work, social or home commitments too? Should you intersperse *Revision Pack* work with working on this Guide, so as to vary the type of study?

As a result of your work so far on the *Revision Pack*, do you need to revise your schedule? Do you need to find more study time or perhaps you are getting up to speed quicker than you thought possible. Have priorities changed? Revise your plans as necessary to make the best use of your time.

## Writing mathematics

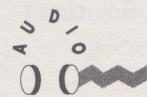
An integral part of learning and doing mathematics involves communication. You have already been reading and responding to text, listening to audio tape sequences, writing notes and doing calculations. You may also have spoken with your tutor or discussed some of the work with your family and friends.

During the course you will need to communicate mathematics in writing, to yourself and to your tutor in written assignments. This section is designed to help you to work on your skills in writing mathematics clearly and succinctly.

### Activity 4.10 Writing skills

*Listen to Band 3, ‘Writing mathematics’, on the Preparatory audio tape.*

You need to have the next pages of this Guide open while you listen. You will also need, for reference, the notes you have made on the mathematics you have been working on from the *Revision Pack*.



**Frame 1**

(1)  $ax + b^2$   
 (2)  $a(x + b)^2$   
 (3)  $(ax + b)^2$   
 (4)  $(ax)^2 + b^2$

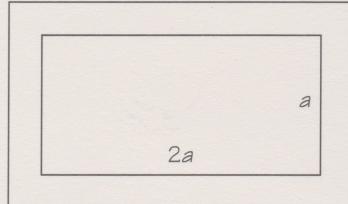
**Frame 2**

Solution 1

$$\begin{aligned} 2a + 3 &= 17 - 5a \\ = 2a + 5a + 3 &= 17 \\ = 2a + 5a &= 17 - 3 \\ = 7a &= 14 = a = 2 \end{aligned}$$

Solution 2

$$\begin{aligned} 2a + 3 &= 17 - 5a \\ \text{so } 2a + 5a + 3 &= 17 \\ \text{and } 2a + 5a &= 17 - 3 \\ \text{that is } 7a &= 14 \\ \text{hence } a &= 2 \end{aligned}$$

**Frame 3**

The diagram shows a rectangular lawn with sides of lengths  $a$  metres and  $2a$  metres, surrounded by a path of width one metre.  $a$  is a whole number.

**Frame 4**

Write down an expression for the total area occupied by lawn and path.

**Answer**

$$(1) \text{ Total area} = (a+2)(2a+2) \text{ m}^2$$

Alternative answers

$$(2) 2a^2 + 2(2a) + 2a + 4 \text{ m}^2$$

$$(3) 2a^2 + 2(2a+2) + 2a \text{ m}^2$$

$$(4) 2a^2 + 6a + 4 \text{ m}^2$$

**Frame 5**

Find the area of the path.

**Answer**

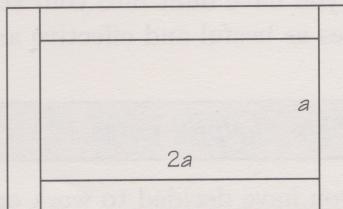
The area of the path is equal to the area of the lawn subtracted from the total area.

Since the total area is  $(a+2)(2a+2)$  m<sup>2</sup> and the area of the lawn is  $2a^2$  m<sup>2</sup>, the area of the path is  $(a+2)(2a+2) - 2a^2$  m<sup>2</sup>. This is equal to  $2a^2 + 6a + 4 - 2a^2$  m<sup>2</sup> that is,  $6a + 4$  m<sup>2</sup>.

**Frame 6**

Show that the number of square slabs of side one metre needed to pave the path is given by  $6a + 4$ .

**Answer**



As shown in the diagram, the path can be divided into four rectangular strips, two of which measure  $2a$  m by 1 m and can be paved with  $2a$  slabs, and two of which measure  $a+2$  m by 1 m and can be paved with  $a+2$  slabs. Since  $a$  is a whole number, both  $2a$  and  $a+2$  are whole numbers.

The total number of slabs needed to pave the whole path is therefore

$$2(2a) + 2(a+2) = 4a + 2a + 4 = 6a + 4$$

## Frame 7

The following table summarises the types of instructions commonly used in assignment questions.

Write down ...	Determine ...	Show ...
	Find ...	Verify ...
	Derive ...	Prove ...
An answer is all that is required. However, if you show some working, you may get some marks even if your answer is wrong.	Justification for your answer is required. This will be reflected in the marks awarded.	The answer is given to you. All marks are awarded for a convincing argument.

Communication is an important skill which you will develop while studying.

All through your study of MST121, you will be writing solutions to assignment questions which will be marked by your tutor. As the audio band indicated, writing mathematics is a specific skill which needs to be developed and practised: there is a difference between putting down a few symbols for your own use and writing a mathematical solution for someone else to read. In attempting the exercises in the *Revision Pack*, you may have written down very little, perhaps just enough to convince yourself that you could answer the questions. This may suffice now (though you may have reconsidered this as you listened to Band 3 of the audio tape), but this is not what your tutor will expect in response to assignment questions. Your tutor will hope to receive solutions which are clearly set out and thus easily understood. Moreover, you may want to use your solutions for revision, months after they were written, so you too will want them to be self-contained, able to stand on their own and easy to read.

First reconsider note-taking. As you work through any parts of the *Revision Pack* which you have built into your study plan, concentrate on making your own notes as useful and effective as possible.

### Activity 4.11 Making helpful notes

Choose a topic that you have decided to work on from the last three modules of the *Revision Pack*. Work through this now, trying to implement any changes in note-taking which you have identified as needed through listening to Band 3 of the audio tape.

When you have finished, examine your notes to see how successful you have been.

### Comment

Effective note-taking, like active reading, improves and develops with practice.

The act of taking notes can help you to remember material. You might consider putting more effort into note-taking. For example, making a detailed set of notes (but not writing out the whole section!) at the first reading, then condensing them to a smaller set illustrating only the main points, possibly condensing them yet again and finally filing them for future reference is a possible strategy.

Do your notes help you to reconstruct what you have read?

If you are using your notes to review your work, you should be able to decide whether or not they are adequate. The secret of good note-taking is to achieve a sensible balance between length and detail so that only the important results, and not too much unimportant detail, are included – though at the beginning it is not so easy to decide which is which and where to place the emphasis. Most people will want to include new definitions, and practise using new symbols and notation. Forms of recording include lists, worked examples and diagrams to illustrate ideas and other associated knowledge. You may already have used some of these in your notes on the frames on which you worked in response to Band 3 of the audio tape.

If you think that your notes could be improved, perhaps you should consider including less material, using larger paper or using more colours. If you are annotating your texts, are you picking out too much or too little? Again, would more colours help?

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## 5 Course assessment

### Assignments

Assessment and feedback are essential parts of learning. You need constructive feedback to enable you to improve your performance in future work. You have been involved in self-assessment when using the Diagnostic Quiz (in the *Revision Pack*) and the activities in this Guide, but so far you have not had the opportunity to receive much external feedback on your performance.

During the course you will have frequent opportunities to test your understanding of the course material by answering assignment questions. Assignments also provide a useful incentive for keeping up to date with your studies because there are strict deadlines for their submission!

There are two sorts of assignment: computer-marked assignments (CMAs) and tutor-marked assignments (TMAs). For each part of the course you will receive an assignment booklet. The preparatory pack includes a practice CMA and a practice TMA, which will start the process of external assessment and feedback. Although they do not count towards your final course grade (that is, they are formative rather than summative), they are an essential part of preparing yourself for the course – including learning how to fill in the forms which need to accompany submissions.

Unlike formative assignments, summative assignments count towards your final course grade.

### Computer-marked assignments

Computer-marked assignments comprise short multi-choice questions designed to help you assess your understanding of basic concepts. They also provide you with a chance to practice your mathematical skills.

#### Activity 5.1 Trying the questions

Try the CMA questions in the *Preparatory Assignment Booklet* now (but don't write on the CMA form yet).

Write down your working and answers, and file them so you can easily refer to them.

#### Comment

It is not necessary that you should be able to answer all the questions before you send in the assignment – the instructions for submission on the front of the booklet tell you what to do about ‘unanswered’ questions. The feedback letter will explain them to you. However, it is always worth having a go at every question. Try the following procedure with questions about which you are unsure.

1. Go through the relevant teaching material again.
2. Seek advice from your tutor or from fellow students.
3. As a last resort, guess – as you will probably have eliminated some of the most unlikely possibilities. Like a missing answer, there is no penalty for a wrong answer. However, do remember to read any feedback comments, even if your guess was right.

Once you have decided on your answers, you must transfer them to a computer-marked assignment form (CMA form). You will find a reproduction of a CMA form and instructions for its use in the Appendix.

A CMA form is included in this mailing.

### **Activity 5.2 Filling in a CMA form**

Turn to the Appendix and read the instructions on how to fill in the CMA form.

Fill in Part 1 of the CMA form with your own details and transfer your answers into the cells in Part 2 of the form.

You will see that as well as options A to H, there are two additional columns within the CMA form: ‘?’ and ‘U’. If you do not know the answer to a particular question and wish to avoid guessing, fill in the ‘?’ cell. However, if you think that the question itself is unsound (i.e. that it cannot be answered or that there is no option corresponding to your answer), then indicate this by picking the ‘U’ cell as well as another answer, perhaps the ‘?’. Using the ‘U’ cell will cause the question to be checked. If there is an error in a question in a summative assignment, that question may be ignored for assessment purposes.

*You must respond to each question with a letter (or letters) or use ‘?’.*

You should now be ready to send off your CMA form. Fold it inwards along the central dotted line and post it in the envelope provided. As long as it is received at the Open University no later than the cut-off date, it will be processed and you will receive a feedback letter.

While you wait for your feedback letter, consider what to do next. Submitting assignments is often the occasion for some focused self-evaluation. If you encountered difficulties with any of the questions that were based on the materials you have studied so far, then perhaps you should spend some more time on the parts of the *Revision Pack* to which they correspond.

Now consider the way in which you tackled this computer-marked assignment. One extreme would have been to look for similar examples in the *Revision Pack* and copy the method, just changing the numbers, without trying to work them out independently. This may lead to an encouraging response from the computer, but it does not help you to learn mathematics or judge your progress. Obviously, when doing summative assignments during the course you will want to maximise your marks, but you can also use assignments to help you assess your progress.

Similarly, do not adopt the opposite extreme of sending only those answers which you can produce without reference to the text; there is a lot to be gained from a mixture of these approaches. You can tackle an assignment in much the same way as you tackle a section of text. When you come to work on the other computer-marked assignments, you might like to tackle them using one or more of the following approaches.

- ◊ Look through all the questions, and sort out those that you think you can do immediately and those which require further work.
- ◊ Do the questions as you go along, working on questions related to a particular chapter as part of your work on that chapter.

- ◊ Study your notes and/or the material in the text relevant to those questions that you cannot tackle immediately.
- ◊ Try all the questions without using the text and note those which you cannot do. When attempting a question, work it through to an answer, then look at the options. If there is no option corresponding to your answer, you may need to rework the question.
- ◊ Go back to the text for help with questions which are still unanswered and for reassurance about those answers in which you are not confident.
- ◊ Annotate or supplement your notes to cover any deficiencies.
- ◊ Make a note of problem areas and come back to them in a week or so to see whether you have solved the problems.
- ◊ Seek advice from your tutor or from fellow students.

### ***Activity 5.3 Topic check***

Go back over the practice CMA now and make a note of any topics to which you feel you should return later to check your understanding. If appropriate, make a list of topics on which you would like to do further work during the preparation period.

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The remainder of this section should be read after you receive your feedback letter. In the meantime, continue with your planned preparation work. Don't forget to come back to this section when your feedback letter arrives.

When you receive your feedback letter, naturally the first thing at which you look is the overall result. We hope that you will be satisfied with your performance. If not, there may be some areas of misunderstanding. Checking through a marked assignment is an important part of the learning process: you can discover misconceptions and errors in work which, presumably, you thought was correct. Use your filed working and answers to identify careless errors or misconceptions, or where you filled in the wrong letter by mistake.

### ***Activity 5.4 Using feedback***

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Check through the assignment again, picking out questions which you answered incorrectly, and possibly add to the list of topics you started in Activity 4.4. (You can ignore silly arithmetical errors unless the message is that you make too many!) If necessary, revise your planning to see if you can fit in some extra revision.

## Tutor-marked assignments

Tutor-marked assignments consist of long questions presented in parts, often with later parts making use of results obtained earlier. Your tutor will provide helpful comments and advice on the assignments submitted, both on the mathematics and your presentation skills.

The practice TMA in the *Preparatory Assignment Booklet* is designed to help you to consolidate your learning so far, from this text and the *Revision Pack*, to tackle and write solutions to a tutor-marked assignment, and to use the feedback from your tutor to improve your understanding, and your mathematical and communication skills.

When you are faced with a written question or problem to solve, you should make sure that you read it carefully. It is important that you get to grips with it in two ways: first absorb the information given and secondly find out what the question is really asking. Your solution will link the two. This method can be summarised by the following questions.

What do I know?

What do I want?

Try to decide, not only what you *know* from the question itself, but also what you *know* from past experience which is relevant to the problem.

Much of the mathematics in MST121 is introduced through a practical situation or problem which mathematics can help to explain or solve. This means that aspects of problems in assignments will have to be translated into mathematical form, perhaps by drawing a diagram or a graph, perhaps by using a formula, or perhaps by a mixture of all these, as a first step in the solution. It also means that the solution you obtain needs to be checked against what you *know* to be sure that it makes sense in the context of the problem. The practice TMA is designed to give you some experience of this.

When you consider what you *want*, you should first decide whether you have to find an answer or show that something is true. If you do not take time to do this, you may end up not really answering the question – you may even get unnecessarily stuck.

This process is known as *mathematical modelling* and will be discussed in greater detail in MST121.

Recall the different styles of questions examined in Band 3 of the audio tape.

### Activity 5.5 Starting a TMA

Read through the practice TMA in the *Preparatory Assignment Booklet* now, noting what is being asked in each question. Work through each question. If you get stuck, remember to look again at the information given by the question and consider what previous knowledge you need to apply. If you cannot bring such previous knowledge to mind immediately, there may be a passage in the *Revision Pack* which will help.

When you have had a serious try at all the questions, take a break.

When you reach an answer, or you are about to give up because you are stuck, it may help to review your work. Try to write out your thinking as clearly as possible, so that you can easily see each step and the ideas on which each is based, and consider whether any answers you have come up with ‘make sense’. You may find that you need to leave the problem for a while and then come back to it, in order to see things more clearly. In this case, it is vital that you have written down what you have done so far.

If you cannot make any progress with a problem, it is a good idea to talk to someone about it. This might be your tutor, but it could be a fellow student or a friend. The act of describing a problem to someone can often be enough to help you see what you should do to arrive at a solution.

When you write out your solutions for submission, remember that you are writing to communicate with your tutor. This is a particular case of ‘writing mathematics for others’. Recall what was said on Band 3 of the audio tape and consider how you can write mathematics which can be understood easily by *anyone* reading it, such as a fellow student.

Once again, it takes practice, but the guidelines below may be helpful.

- ◊ Ensure that what you write consists of sentences. Many people believe that mathematics is a language which is entirely made up of (often unfamiliar) symbols. It is not: many symbols act merely as abbreviations which, when read, can be translated back into spoken words. Remember, too, to punctuate your work.
- ◊ Ensure that there are sufficient words of explanation so that the reader is led line by line through your proposed solution or argument.

One way of testing whether or not you are conforming to the first guideline is to read your solutions through aloud. Speaking aloud involves you in translating every symbol on the page into its verbal equivalent. If you find yourself needing to say more than is written on the page, you may need to expand your written account. When reading each solution aloud, pause only when you have used an appropriate punctuation mark.

### **Activity 5.6 Presenting a TMA**

Go through the first draft of your practice TMA now. Complete any of the questions which you left unfinished, but can now see how to tackle.

Now write out your solutions with your tutor in mind. Then look over your solutions as if you were the tutor. Is each answer in the correct form, e.g. in scientific notation, to the required accuracy, with the correct units? Look for lack of clarity or misuse of notation or language, and revise and improve your solutions where you can.

Finally, read your solutions aloud, as advised above, and make any necessary amendments.

Once you have completed all the questions on a TMA, check the solutions, read them through and assemble them. Also make sure you have a copy of your work in case it is lost in the post – remember, it is your responsibility to see that TMAs arrive at your tutor’s address by the required date. If you are studying this section well in advance of the start of the course, you may not yet have been allocated a tutor, in which case just carry on with the rest of your preparation until you hear from your Regional Centre. Remember also that if you have used a large number of pages, you may need more than the basic rate of postage. However, you should not need to write an excessive amount, so if you have done so, you may want to be more concise in future.

If you find that you cannot answer all the questions, send what you can do to your tutor, but try to explain why you have left gaps.

Before you post your TMA answers to your tutor, you must attach a completed TMA form (PT3). The PT3 form is a document used for a number of administrative purposes, including the recording of your grade. One copy of the form is returned to you with your marked assignment, and on it you will see your mark and a summary of your performance on the TMA. You will find a PT3 form in this package, and notes on its completion are given in the Appendix to this Guide.

### **Activity 5.7 Submitting a TMA**

- ◊ Make sure each page has:
  - ◊ your name and personal identifier;
  - ◊ the course code and assignment number (MST121 51);
  - ◊ a page number and the total number of pages, e.g. 1/8 for the first page of 8.
- ◊ Make sure you have a copy of your work.
- ◊ Fill in the student section of the PT3.
- ◊ Send the PT3 and your TMA answers to your tutor to arrive before the cut off date (making sure it has the correct postage). It is best not to use Recorded Delivery – your tutor may not be in and so will have to collect it! Evidence of posting can be obtained through a Certificate of Posting, which is free from the Post Office.

The remainder of this section should be done after your script is returned. In the meantime carry on with your other preparation work.

Your tutor's task is two-fold: not only to grade the TMA, but also to supply comments to clarify ideas which you may have misinterpreted or not fully understood, to correct mathematical errors and to suggest ways whereby style of presentation can be improved. The comments made on assignments are an important and integral part of learning with the Open University and you should study these comments as soon as your assignments are returned.

### **Activity 5.8 A TMA returned**

When you receive your marked TMA:

- (a) read the comments on the PT3;
- (b) set aside time to go through the detailed comments on the script;
- (c) go through each question and each comment carefully, making sure you understand all the comments;
- (d) revise any topics which need brushing up in the light of your tutor's comments;
- (e) contact your tutor if you are unsure of anything concerning the TMA or your preparation in general (telephone, write or use email).

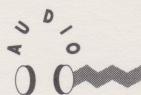
## 6 Introduction to the course

You have had the chance to practise many of the skills and techniques that you will need in studying MST121, including the experience of submitting assignments and receiving feedback.

You should now be ready – indeed eager – to embark on the course proper.

### Introduction to modelling

#### Activity 6.1 Audio band 4



*Listen to Band 4, 'Mathematics and the real world', on the Preparatory audio tape.*

Make brief notes on any aspects and topics which you find interesting.

Although this audio band has been designed to stand alone, the material refers to two examples from the Open University television programme 'Refining the View', the last of the MST121/MS221 TV series.

#### Comment

You will be doing more on modelling examples during the course. Think about other situations which you can now recognise as modelling.

#### Activity 6.2 When Block A materials arrive

You should receive the first course mailing in mid-January.

- ◊ Open it on arrival.
- ◊ Check the contents against the Contents Checklist. (If anything is missing, follow the instructions on the Checklist.)
- ◊ Read the Stop Press.
- ◊ Correct any errata as notified in the Stop Press.
- ◊ Organise the materials (perhaps have a quick flick through each, including the mathematical handbook) and then store them together.
- ◊ Put the course calendar in a prominent place; put your tutorial dates on it and highlight the assignment cut-off dates.
- ◊ Get ready to start work – which includes planning your time to meet the assignment cut-off dates.
- ◊ Load Mathcad into your computer.

The Course Team offer you their best wishes. Good luck and enjoy the course!

## 7 Preparation review

This Guide has given you opportunities to identify what you need to do to prepare yourself for studying MST121, and to plan, carry out and evaluate that preparation. We hope that in doing this you have achieved most of the learning outcomes listed below.

### Activity 7.1 Preparation checklist

Use the following to ensure that your preparation is complete.

#### **Learning outcomes**

##### **Used the Revision Pack to**

- ◊ Fill gaps in mathematical knowledge
- ◊ Revise knowledge and understanding
- ◊ Become fluent in techniques

##### **Become confident in using equipment required for study**

- ◊ Personal computer
- ◊ Scientific or graphics calculator
- ◊ Audio playback facility

##### **Experience of following OU procedures**

- ◊ Submitting a CMA
- ◊ Submitting a TMA

##### **Skills to use in distance learning**

- ◊ Planning work
- ◊ ‘Active’ reading
- ◊ Making notes
- ◊ Writing assignments
- ◊ Reviewing work
- ◊ Using feedback

### Activity 7.2 Recognising skills

Think back over the work that you have done in preparing for MST121, and try to identify the skills that you have been using. It may be possible to classify them under headings such as mathematical skills, reading for learning, problem solving, and so on.

#### **Comment**

You may find it interesting to compare lists with fellow students, if this is possible.

# *Appendix: Submitting assignments*

## **CMA forms**

A supply of CMA forms will be included in mailings of course material, together with addressed envelopes in which to return them to the Open University. As you can see from the example on the next page, the CMA form is in two parts.

### ***Completing Part 1 of the CMA form***

Part 1 is to identify you, the course you are taking, and the assignment you are submitting. Fill in the left-hand boxes, using an HB pencil. Then enter your personal identifier, course code and assignment number by marking the appropriate cells with an HB pencil: draw a line across the cell joining up the two dots (–). It is important that you do this neatly and correctly in accordance with the instructions on the CMA form; do not continue your line into another cell.

Suppose that your personal identifier is M3017392 and that you are submitting CMA 51 for MST121. To record your personal identifier, mark M in the first column. In the seven columns reserved for the numerical part of the identifier mark 3 in the first column, 0 in the next, and so on. To record the course code (MST121) and the assignment number (51) in the next block, leave the first column blank and mark M in the second column, S in the third and T in the fourth, mark 1 in the fifth column and 2, 1, 5 and 1 in the last four columns. (A course code such as T102, with only one letter, uses only the fourth letter column. One with two letters, such as MU120, leaves the first two columns blank, while a four-letter course code uses all the letter columns.)

### ***Completing Part 2 of the CMA form***

Part 2 is for your answers to the CMA questions. This part of the CMA form is divided into three columns, with twenty rows in each column, giving sixty individual rows which are numbered from 1 to 60. CMA question numbers correspond to the rows in which the questions are to be answered; if a question is to be answered in several rows, it will be called, say, Q3–5 (which means answer in rows 3–5). You might like to mark your answers on the question booklet before filling in your CMA form. This gives you a chance for second thoughts and provides a record of your answers.



## COMPUTER MARKED ASSIGNMENT FORM

05-98

## PART 1

Complete the details below, in pencil, and mark your PI and course/assignment details in the boxes to the right.

Name	K . C . LEE
Address	13 SCOTT PLACE
	MILTON KEYNES
	MK 10 5AS
Personal Identifier	M3017392
Course and Assignment Number	MST121 51
Date Sent	12/1/2000

## IMPORTANT NOTES

1. Please check that all PART 1 has been filled in correctly.
2. Only use an HB pencil to complete this form and press firmly.
3. Shown below are examples of the correct marks to use. Do not use any other types of mark.
4. Send the CMA to the Assistant Registrar (Assignments) in the CMA envelope provided. It is strongly recommended that you obtain a Certificate of Posting from a Post Office.
5. A CMA will NOT be marked, for any reason, if it is received after the cut-off date, unless you have a Certificate of Posting dated prior to that date.
6. DO NOT enclose your Certificate of Posting with this CMA. You may be required to produce the original if there is a problem.

## PLEASE DO NOT PUNCH HOLES IN THIS FORM

Fold this form INWARDS along the dotted line

## PART 2

## ANSWER

1	A	B	C	D	E	F	G	H	?	U	21	A	B	C	D	E	F	G	H	?	U	41	A	B	C	D	E	F	G	H	?	U
2	A	B	C	D	E	F	G	H	?	U	22	A	B	C	D	E	F	G	H	?	U	42	A	B	C	D	E	F	G	H	?	U
3	A	B	C	D	E	F	G	H	?	U	23	A	B	C	D	E	F	G	H	?	U	43	A	B	C	D	E	F	G	H	?	U
4	A	B	C	D	E	F	G	H	?	U	24	A	B	C	D	E	F	G	H	?	U	44	A	B	C	D	E	F	G	H	?	U
5	A	B	C	D	E	F	G	H	?	U	25	A	B	C	D	E	F	G	H	?	U	45	A	B	C	D	E	F	G	H	?	U
6	A	B	C	D	E	F	G	H	?	U	26	A	B	C	D	E	F	G	H	?	U	46	A	B	C	D	E	F	G	H	?	U
7	A	B	C	D	E	F	G	H	?	U	27	A	B	C	D	E	F	G	H	?	U	47	A	B	C	D	E	F	G	H	?	U
8	A	B	C	D	E	F	G	H	?	U	28	A	B	C	D	E	F	G	H	?	U	48	A	B	C	D	E	F	G	H	?	U
9	A	B	C	D	E	F	G	H	?	U	29	A	B	C	D	E	F	G	H	?	U	49	A	B	C	D	E	F	G	H	?	U
10	A	B	C	D	E	F	G	H	?	U	30	A	B	C	D	E	F	G	H	?	U	50	A	B	C	D	E	F	G	H	?	U
11	A	B	C	D	E	F	G	H	?	U	31	A	B	C	D	E	F	G	H	?	U	51	A	B	C	D	E	F	G	H	?	U
12	A	B	C	D	E	F	G	H	?	U	32	A	B	C	D	E	F	G	H	?	U	52	A	B	C	D	E	F	G	H	?	U
13	A	B	C	D	E	F	G	H	?	U	33	A	B	C	D	E	F	G	H	?	U	53	A	B	C	D	E	F	G	H	?	U
14	A	B	C	D	E	F	G	H	?	U	34	A	B	C	D	E	F	G	H	?	U	54	A	B	C	D	E	F	G	H	?	U
15	A	B	C	D	E	F	G	H	?	U	35	A	B	C	D	E	F	G	H	?	U	55	A	B	C	D	E	F	G	H	?	U
16	A	B	C	D	E	F	G	H	?	U	36	A	B	C	D	E	F	G	H	?	U	56	A	B	C	D	E	F	G	H	?	U
17	A	B	C	D	E	F	G	H	?	U	37	A	B	C	D	E	F	G	H	?	U	57	A	B	C	D	E	F	G	H	?	U
18	A	B	C	D	E	F	G	H	?	U	38	A	B	C	D	E	F	G	H	?	U	58	A	B	C	D	E	F	G	H	?	U
19	A	B	C	D	E	F	G	H	?	U	39	A	B	C	D	E	F	G	H	?	U	59	A	B	C	D	E	F	G	H	?	U
20	A	B	C	D	E	F	G	H	?	U	40	A	B	C	D	E	F	G	H	?	U	60	A	B	C	D	E	F	G	H	?	U

PERSONAL IDENTIFIER											
'A'	'0'	'0'	'0'	'0'	'0'	'0'	'0'	'0'	'0'	'0'	'0'
'B'	'1'	'1'	'1'	'1'	'1'	'1'	'1'	'1'	'1'	'1'	'1'
'C'	'2'	'2'	'2'	'2'	'2'	'2'	'2'	'2'	'2'	'2'	'2'
'D'	'3'	'3'	'3'	'3'	'3'	'3'	'3'	'3'	'3'	'3'	'3'
'E'	'4'	'4'	'4'	'4'	'4'	'4'	'4'	'4'	'4'	'4'	'4'
'F'	'5'	'5'	'5'	'5'	'5'	'5'	'5'	'5'	'5'	'5'	'5'
'G'	'6'	'6'	'6'	'6'	'6'	'6'	'6'	'6'	'6'	'6'	'6'
'H'	'7'	'7'	'7'	'7'	'7'	'7'	'7'	'7'	'7'	'7'	'7'
'K'	'8'	'8'	'8'	'8'	'8'	'8'	'8'	'8'	'8'	'8'	'8'
'L'	'9'	'9'	'9'	'9'	'9'	'9'	'9'	'9'	'9'	'9'	'9'
'M'											
'N'											
'P'											
'R'											
'S'											
'T'											
'U'											
'W'											
'X'											
'Y'											
'Z'											

## CORRECT MARKS

Draw pencil line between dots - do not mark rest of box	A
To cancel a mark pencil in the coloured part of the box.	
DO NOT RUB OUT	

COURSE AND ASSIGNMENT NUMBER											
'A'	'A'	'A'	'A'	'O'							
'B'	'B'	'B'	'B'	'B'	'1'	'1'	'1'	'1'	'1'	'1'	'1'
'C'	'C'	'C'	'C'	'C'	'2'	'2'	'2'	'2'	'2'	'2'	'2'
'D'	'D'	'D'	'D'	'D'	'3'	'3'	'3'	'3'	'3'	'3'	'3'
'E'	'E'	'E'	'E'	'E'	'4'	'4'	'4'	'4'	'4'	'4'	'4'
'F'	'F'	'F'	'F'	'F'	'5'	'5'	'5'	'5'	'5'	'5'	'5'
'G'	'G'	'G'	'G'	'G'	'6'	'6'	'6'	'6'	'6'	'6'	'6'
'H'	'H'	'H'	'H'	'H'	'7'	'7'	'7'	'7'	'7'	'7'	'7'
'K'	'K'	'K'	'K'	'K'	'8'	'8'	'8'	'8'	'8'	'8'	'8'
'L'	'L'	'L'	'L'	'L'	'9'	'9'	'9'	'9'	'9'	'9'	'9'
'M'	'M'	'M'	'M'	'M'							
'N'	'N'	'N'	'N'	'N'							
'P'	'P'	'P'	'P'	'P'							
'R'	'R'	'R'	'R'	'R'							
'S'	'S'	'S'	'S'	'S'							
'T'	'T'	'T'	'T'	'T'							
'U'	'U'	'U'	'U'	'U'							
'W'	'W'	'W'	'W'	'W'							
'X'	'X'	'X'	'X'	'X'							
'Y'	'Y'	'Y'	'Y'	'Y'							
'Z'	'Z'	'Z'	'Z'	'Z'							

## OFFICE USE ONLY

## **TMA forms**

A TMA form (PT3) will be sent to you with each pack of assignment material. You must attach a PT3 to each TMA that you submit, and send it to the tutor responsible for marking and commenting on it. Each form must relate to one assignment only, and you must not split your assignment and send the parts separately, unless explicitly instructed to do so.

The TMA form has three copies, and you must attach them all to your TMA. To fill in the form, rest it on a hard surface and use a ball-point pen, pressing firmly – you don't need carbon paper – or use a typewriter. Make sure that all three copies are legible. An example of the form is given on the next page. You need to fill in Section 1 only, as follows.

- ◊ Write your name and address in the top box, which will show through a window envelope when it is returned to you.

The next two boxes are for your regional code and posting date.

- ◊ Enter your regional code (e.g. 01 for London, 12 for Ireland), putting one digit in each box.
- ◊ The date in the next box should be the date you actually put your assignment in the post.
- ◊ Write your telephone number, including STD code, in the next box.
- ◊ Your personal identifier goes in the next box, e.g. M3017392.
- ◊ The last two boxes are for your course code and assignment number, e.g. MST121 10.

### ***Sending in your TMA***

Unless you are told otherwise, use A4 paper (the same size as this page) for your TMA answers, and leave a wide margin, about two inches, on the left-hand side for your tutor's comments. Put your name, personal identifier, course code and assignment number at the top of every sheet.

Make sure that you have completed all parts of Section 1 of the PT3 correctly before sending your assignment in an envelope addressed to your tutor. Write your own name and address on the back of the envelope.



**COPY**

1

# **TMA FORM (PT3)**

## **CENTRAL RECORD**

## CENTRAL RECORD

**NOTE:** Please use a ball point pen and rest on hard surface when completing this form - carbon paper is not required.  
Ensure all three copies are legible and that the complete assignment is sent with the form.

SECTION 1 STUDENT TO COMPLETE		SECTION 2 TUTOR TO COMPLETE IN BLOCK CAPITALS	
Name	K. C. LEE		
Address	13 SCOTT PLACE		
	MILTON KEYNES		
Postcode/ Country	MK10 5AS		
Regional Code	0 2	Date Sent to Tutor	20 01 00
Telephone	01908 532100		
Personal Identifier	M 3 0 1 7 3 9 2		
Course Code	NST121	TMA No.	1 0
TAKE CARE TO ENTER THESE NUMBERS CORRECTLY			
<b>FOR OFFICE USE ONLY</b> Assignment Handling Office <input type="text"/> Date <input type="text"/>			
Question Grades/Scores		Overall Grade/Score	
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20

## TUTOR'S GENERAL SUMMARY \_\_\_\_\_

Printed in the United Kingdom by Hobbs the Printers Ltd,  
Brunel Road, Totton, Hampshire, SO40 3YS